

What is claimed is:

1. A method for managing access rights of host resources with respect to corresponding storage systems, the method comprising:
  - 5 receiving a selection of at least one host resource associated with a storage area network;  
in addition to receiving the selection of the at least one host resource, receiving a selection of at least one storage parameter associated with the storage area network, the selection of the at least one storage parameter including  
10 selection of a vendor type associated with the at least one storage system resource; and  
correlating the selection of the at least one host resource with the selection of the at least one storage parameter to identify:
    - 15 i) storage devices of the at least one storage system resource corresponding to the at least one storage parameter, and  
ii) access control rights of the at least one host resource with respect to the storage devices.
2. A method as in claim 1 further comprising:
  - 20 via a common and consistent graphical user interface, providing a user an ability to display the access control rights of the at least one host resource with respect to different vendor types of storage system resources.
3. A method as in claim 2 further comprising:
  - 25 via the common and consistent graphical user interface, enabling a user to modify access rights associated with the at least one host resource for a selected storage system resource of a selected vendor type.
4. A method as in claim 3 further comprising:

generating vendor specific commands, depending on the selected storage system resource of the selected vendor type, to modify access rights associated with the storage devices in the selected storage system resource.

5     5.     A method as in claim 2 further comprising:

             for a first selected storage system resource of a first vendor type,  
generating a first set of vendor specific commands to modify access rights  
associated with the first selected storage system resource; and

             for a second selected storage system resource of a second vendor type,  
10     generating a second set of vendor specific commands to modify access rights  
associated with the second selected storage system resource.

6.     A method as in claim 1 further comprising:

             generating an output to a display screen;

15     in a first region on the display screen, displaying multiple icons  
representing corresponding host resources in the storage area network; and

             in relation to at least one of the multiple icons, maintaining corresponding  
visual regions to receive input commands from a user making the selection of the  
at least one host resource.

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7.     A method as in claim 6, wherein displaying the multiple icons includes:

             displaying a hierarchy of multiple icons; and

             enabling a user to expand a view of the hierarchy of multiple icons to  
facilitate the selection of the at least one host resource associated with the storage  
25     area network.

8.     A method as in claim 1 further comprising:

             providing a view of storage devices associated with the selection of the at  
least one storage parameter, the view including a visual indication whether any of  
30     the at least one host resource has access rights to a corresponding storage device.

9. A method as in claim 8 further comprising:

providing an indication which host resources have access rights to corresponding storage devices.

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10. A method as in claim 1, wherein receiving the selection of the at least one parameter includes receiving a signal identifying a selected vendor type, the method further comprising:

in response to receiving the selected vendor type, displaying storage system resources associated with the selected vendor type; and

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providing a unique identifier associated with each of the displayed storage system resources.

11. A method as in claim 10 further comprising:

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enabling a user to select a storage system resource of the selected vendor type; and

based on a user selected storage system resource of the selected vendor type, providing a display of storage devices associated with the at least one host resource and the user selected storage system resource.

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12. A method as in claim 11 further comprising:

providing a pull-down menu of functional options associated with the selected vendor type, the pull-down menu of functional options including at least one of:

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i) display physically connected storage system resources associated with the at least one host resource for the selected vendor type;

ii) display all storage devices associated with the selected vendor type; and

iii) display physically unconnected storage devices associated with the at least one host resource for the selected vendor type.

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13. A method as in claim 1 further comprising:  
displaying unique identifiers of storage system resources;  
receiving a signal identifying a user selected storage system resource; and  
for the user selected storage system, displaying access ports associated  
5 with accessing the storage devices.
14. A method as in claim 13 further comprising:  
enabling a user to modify a selection of at least one of the displayed access  
ports;  
10 receiving a modified selection of the displayed access ports; and  
displaying a list of storage devices depending on the modified selection of  
the multiple access ports.
15. A method as in claim 1 further comprising:  
15 displaying multiple storage device icons in a first region of a display  
screen, each storage device icon representing a corresponding storage device  
potentially accessible by the at least one host resource; and  
displaying a related tree selection in a second region of the display screen,  
the related tree selection indicating which, if any, of the at least one host resource  
20 has access rights to the at least one storage device represented by the storage  
device icons displayed in the first region.
16. A method as in claim 1 further comprising:  
receiving a signal indicating a selected at least one storage device; and  
25 providing a display for a network manager to modify access rights  
associated with a selected at least one host resource for accessing the selected at  
least one storage device.
17. A method as in claim 1 further comprising:

selectively providing symbols near storage device icons associated with the storage devices, the symbols identifying a number of host resources able to access a corresponding storage device.

- 5     18.     A method as in claim 1 further comprising:
- displaying a list of storage devices associated with a selection of a particular storage system of a selected vendor type; and
- enabling a user to toggle a display view of the storage devices between a table view and an icon view, the table view including a listing of selectable
- 10     storage device icons as well as corresponding access control information, the icon view including a presentation of selectable storage device icons with visual indication of access rights and zoning, pending, locked information.
- 15     19.     A method as in claim 1, wherein receiving the selection of the at least one storage parameter includes at least one of the following:
- i) receiving a selection of a vendor type of storage system resource;
- ii) receiving a selection of a uniquely identified storage system resource of a selected vendor type in step i; and
- iii) receiving a selection of storage ports through host resources access the
- 20     storage devices of the uniquely identified storage system resource of the selected vendor type.
- 25     20.     A method as in claim 1 further comprising:
- generating an output for a display screen to display an access relationship to a user, the display screen including:
- i) a first region for the user to make the selection of the at least one host resource,
- ii) a second region for the user to make a selection of the at least one storage parameter, and

iii) a third region for viewing the storage devices associated with the at least one storage parameter.

21. A method as in claim 20, wherein receiving the selection of the at least one  
5 storage parameter includes:  
i) receiving a selection of a vendor type of storage system resource;  
ii) receiving a selection of a uniquely identified storage system resource of  
a selected vendor type in step i; and  
iii) receiving a selection of storage ports through host resources access the  
10 storage devices of the uniquely identified storage system resource of the selected  
vendor type.

22. A method as in claim 20, wherein generating the output for the display screen  
includes:  
15 locating the first region on a left side of the display screen;  
locating the second region on an upper right portion of the display screen;  
and  
locating the third region on a bottom right portion of the display screen.

20 23. A method for displaying access rights of host resources with respect to  
corresponding storage system resources in a storage area network, the method  
comprising:  
receiving an identity of at least one selected host resource associated with  
the storage area network;  
25 retrieving a first managed object from a management database that  
corresponds to the at least one selected host resource;  
identifying at least one storage system resource associated with the at least  
one selected host resource based on i) information in the first managed object, and  
ii) information in other corresponding managed objects in the management  
30 database; and

providing a user an ability to display access control rights of the at least one selected host resource with respect to different vendor types of storage system resources.

5     24.     A method as in claim 23 further comprising:

extracting information from the first managed object corresponding to the at least one selected host resource;

extracting information from other managed objects associated with managed entities in the storage area network;

10           storing the information extracted from the first managed object and the other managed objects in corresponding data structures;

based on processing of information in the data structures, identifying an access relationship between the at least one selected host resource and storage devices associated with the storage system resources; and

15           generating an output for a display screen to display the access relationship to a user, the display screen including:

i) a first region for the user to make the selection of the at least one host resource,

20           ii) a second region for the user to make a selection of at least one storage parameter, and

iii) a third region for viewing the storage devices associated with the at least one host resource based on a user selected at least one storage parameter.

25     25.     A method as in claim 24 further comprising:

receiving a user generated selection of the at least one storage parameter in the second region, the user generated selection including:

i) receiving a selection of a vendor type of storage system resource;

30           ii) receiving a selection of a uniquely identified storage system resource of a selected vendor type in step i; and

iii) receiving a selection of storage ports through host resources access the storage devices of the uniquely identified storage system resource of the selected vendor type.

- 5     26.     A computer system for managing access rights of host resources with respect to corresponding storage system resources, the computer system comprising:
- a processor;
- a memory unit that stores instructions associated with an application executed by the processor;
- 10            a communication interface that supports communication with other nodes of the storage area network; and
- an interconnect coupling the processor, the memory unit, and the communication interface, enabling the computer system to execute the application and perform operations of:
- 15            receiving a selection of at least one host resource associated with a storage area network;
- in addition to receiving the selection of the at least one host resource, receiving a selection of at least one storage parameter associated with the storage area network, the selection of the at least one storage
- 20            parameter including selection of a vendor type associated with a storage system resource; and
- correlating the selection of the at least one host resource with the selection of the at least one storage parameter to identify:
- i) storage devices of the storage system resource
- 25            corresponding to the at least one storage parameter, and
- ii) access control rights of the at least one host resource with respect to the storage devices.
27.     A computer system as in claim 26 that additionally performs an operation of:



via a common graphical user interface, providing a user an ability to display the access control rights of the at least one host resource with respect to different vendor types of storage system resources.

5     28.     A computer system as in claim 27 that additionally performs an operation of:  
              via the common graphical user interface, enabling a user to modify access  
rights associated with the at least one host resource for a selected storage system  
resource of a selected vendor type.

10    29.     A computer system as in claim 28 that additionally performs an operation of:  
              generating vendor specific commands, depending on the selected storage  
system resource of the selected vendor type, to modify access rights associated  
with the storage devices in the selected storage system resource.

15    30.     A computer system as in claim 27 that additionally performs operations of:  
              for a first selected storage system resource of a first vendor type,  
generating a first set of vendor specific commands to modify access rights  
associated with the first selected storage system resource; and  
              for a second selected storage system resource of a second vendor type,  
20    generating a second set of vendor specific commands to modify access rights  
associated with the second selected storage system resource.

31.     A computer system as in claim 26 that additionally performs operations of:  
              generating an output to a display screen;  
25            in a first region on the display screen, displaying multiple icons  
representing corresponding host resources in the storage area network; and  
              in relation to at least one of the multiple icons, maintaining corresponding  
visual regions to receive input commands from a user making the selection of the  
at least one host resource.

32. A computer system as in claim 31, wherein displaying the multiple icons includes:
- displaying a hierarchy of multiple icons; and
  - enabling a user to expand a view of the hierarchy of multiple icons to
- 5 facilitate the selection of the at least one host resource associated with the storage area network.
33. A computer system as in claim 26 that additionally performs an operation of:
- providing a view of storage devices associated with the selection of the at
- 10 least one storage parameter, the view including a visual indication whether any of the at least one host resource has access rights to a corresponding storage device.
34. A computer system as in claim 33 that additionally performs an operation of:
- providing an indication which host resources have access rights to
- 15 corresponding storage devices are zoned, pending or locked.
35. A computer system as in claim 26, wherein receiving the selection of the at least one parameter includes receiving a signal identifying a selected vendor type, the method further comprising:
- 20 in response to receiving the selected vendor type, displaying storage system resources associated with the selected vendor type; and
  - providing a unique identifier associated with each of the displayed storage system resources.
- 25 36. A computer system as in claim 35 that additionally performs operations of:
- enabling a user to select a storage system resource of the selected vendor type; and
  - based on a user selected storage system resource of the selected vendor type, providing a display of storage devices associated with the at least one host
- 30 resource and the user selected storage system resource.

37. A computer system as in claim 36 that additionally performs operations of:  
providing a pull-down menu of functional options associated with the  
selected vendor type, the pull-down menu of functional options including at least  
5 one of:  
i) display physically connected storage system resources associated with  
the at least one host resource for the selected vendor type;  
ii) display all storage devices associated with the selected vendor type; and  
iii) display physically unconnected storage devices associated with the at  
10 least one host resource for the selected vendor type.
38. A computer system as in claim 26 that additionally performs operations of:  
displaying unique identifiers of storage system resources;  
receiving a signal identifying a user selected storage system resource; and  
15 for the user selected storage system, displaying access ports associated  
with accessing the storage devices.
39. A computer system as in claim 38 that additionally performs operations of:  
enabling a user to modify a selection of at least one of the displayed access  
20 ports;  
receiving a modified selection of the displayed access ports; and  
displaying a list of storage devices depending on the modified selection of  
the multiple access ports.
- 25 40. A computer system as in claim 26 that additionally performs operations of:  
displaying multiple storage device icons in a first region of a display  
screen, each storage device icon representing a corresponding storage device  
potentially accessible by the at least one host resource; and  
displaying a related tree selection in a second region of the display screen,  
30 the related tree selection indicating which, if any, of the at least one host resource

has access rights to the at least one storage device represented by the storage device icons displayed in the first region.

41. A computer system as in claim 26 that additionally performs operations of:

- 5                   receiving a signal indicating a selected at least one storage device; and  
                  providing a display for a network manager to modify access rights  
associated with a selected at least one host resource for accessing the selected at  
least one storage device.

10   42. A computer system as in claim 26 that additionally performs an operation of:

                  selectively providing symbols near storage device icons associated with  
the storage devices, the symbols identifying a number of host resources able to  
access a corresponding storage device.

15   43. A computer system as in claim 26 that additionally performs operations of:

                  displaying a list of storage devices associated with a selection of a  
particular storage system of a selected vendor type; and  
                  enabling a user to toggle a display view of the storage devices between a  
table view and an icon view, the table view including a listing of selectable  
20   storage device icons as well as corresponding access control information, the icon  
view including a presentation of selectable storage device icons.

44. A computer system as in claim 26, wherein receiving the selection of the at least  
one storage parameter includes at least one of the following:

- 25                   i) receiving a selection of a vendor type of storage system resource;  
                  ii) receiving a selection of a uniquely identified storage system resource of  
a selected vendor type in step i; and  
                  iii) receiving a selection of storage ports through host resources access the  
storage devices of the uniquely identified storage system resource of the selected  
30   vendor type.

45. A computer system as in claim 26 that additionally performs operations of:  
generating an output for a display screen to display an access relationship  
to a user, the display screen including:
- 5 i) a first region for the user to make the selection of the at least one  
host resource,  
ii) a second region for the user to make a selection of the at least  
one storage parameter, and  
iii) a third region for viewing the storage devices associated with  
10 the at least one storage parameter.
46. A computer system as in claim 45, wherein receiving the selection of the at least  
one storage parameter includes:
- 15 i) receiving a selection of a vendor type of storage system resource;  
ii) receiving a selection of a uniquely identified storage system resource of  
a selected vendor type in step i; and  
iii) receiving a selection of storage ports through host resources access the  
storage devices of the uniquely identified storage system resource of the selected  
vendor type.
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47. A computer system as in claim 45, wherein generating the output for the display  
screen includes:
- 25 locating the first region on a left side of the display screen;  
locating the second region on an upper right portion of the display screen;  
and  
locating the third region on a bottom right portion of the display screen.
48. A computer program product including a computer-readable medium having  
instructions stored thereon for processing data information, such that the

instructions, when carried out by a processing device, enable the processing device to perform the steps of:

receiving a selection of at least one host resource associated with a storage area network;

5 in addition to receiving the selection of the at least one host resource, receiving a selection of at least one storage parameter associated with the storage area network, the selection of the at least one storage parameter including selection of a vendor type associated with a storage system resource; and

10 correlating the selection of the at least one host resource with the selection of the at least one storage parameter to identify:

i) storage devices of the storage system resource corresponding to the at least one storage parameter, and

ii) access control rights of the at least one host resource with respect to the storage devices.

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49. A computer system associated with a storage area network, the computer system including:

means for receiving a selection of at least one host resource associated with a storage area network;

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in addition to means for receiving the selection of the at least one host resource, means for receiving a selection of at least one storage parameter associated with the storage area network, the selection of the at least one storage parameter including selection of a vendor type associated with a storage system resource; and

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means for correlating the selection of the at least one host resource with the selection of the at least one storage parameter to identify:

i) storage devices of the storage system resource corresponding to the at least one storage parameter, and

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ii) access control rights of the at least one host resource with respect to the storage devices.